

A NEW WEEVIL GENUS FROM AMERICA
NORTH OF THE ARCTIC CIRCLE AND
NOTES OF FOSSILS FROM PLIOCENE AND
PLEISTOCENE SEDIMENTS
(COLEOPTERA: CURCULIONIDAE)*

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ABSTRACT

Vitavitus thulius Kissinger is described as a new genus and species from a unique specimen from Canada north of the Arctic Circle. The genus occurs as fossils in sediments of middle Pliocene to late Pleistocene age. The new genus is near *Lepidophorus* Kirby; both are assigned tentatively to the subfamily Hyperinae. *Alophus* Schoenherr is assigned to Leptopiinae (= Alophinae).

INTRODUCTION

The genus described herein is of considerable importance from a paleoecological viewpoint, because it represents a significant change in the fauna of Alaska and Alberta during the Pleistocene period. Fossils representing the genus occur in sediments ranging in age from 5.7 million to 27,000 years before the present (BP) according to Matthews (1972). Late Pleistocene assemblages in which it occurs also contain fossils of *Lepidophorus lineaticollis* Kirby; whereas, a late early Pleistocene assemblage from western Alaska (Cape Deceit Formation—Matthews, MS) contains an abundance of fossils representing the new genus, but none of *Lepidophorus*. Younger sediments contain only *Lepidophorus*, indicating the possibility that it replaced the new genus as time passed. Only 1 specimen of the extant species of the new genus is known. At the present time *Lepidophorus lineaticollis* Kirby occurs in Siberia, Alaska, and northern Canada; other species of *Lepidophorus* occur from Alaska into western North America, especially at high elevations.

The taxonomic placement of the new genus is difficult, because comparative information about possible relatives has not been published. In addition the possible relatives are placed in various subfamilies which are not yet adequately defined. The genus is tentatively assigned to Hyperinae.

VITAVITUS Kissinger, NEW GENUS

Diagnosis: Mandible not scarred; frons with small lateral prominence above anterior margin of eye, not narrower than base of rostrum; prothorax with small postocular lobe bearing short setae; elytra 10 striate; female sternum 8 with basal strut longer than apical expansion; female genital tube short, wider than long; coxite sclerotized, bearing long, narrow stylus.

Additional characters as follows: Proventriculus with 8 sclerotized plates bearing setae (type II of Kissinger, 1963). Mandible with (approximately) 3

*Technique and terminology of this paper follow Kissinger (1970).

small setae on basal lateral aspect; lateral margin from base to apex produced into narrow flat margin only in basal 1/2. Scape extends slightly beyond anterior margin of eye; with broad, decumbent scales and suberect, coarse setae. Elytral stria 10 finer than striae 1-9; basal margin vertical, receiving base of prothorax; humeri present, rounded; intervals flat, with broad imbricate scales. Flight wings nonfunctional. Scutellum not visible. Metepisternal suture complete. Suture between sterna 1 and 2 shallower than next suture, broadly, strongly arcuate anteriorly in median aspect. Tibiae 1-3 lacking distinct mucrones (not visible under 100 X). Tarsal segment 3 broadly bilobed, pubescent ventrally. Tarsal claw free. Female genital tube lightly sclerotized; coxite bearing stylus approximately 160 microns long, coxite and stylus bear setae 90 to 180 microns long.

Type-species: *Vitavitus thulius* Kissinger, new species. Name based on Latin, *vita*, for life and, *avitus*, for ancestral.

Vitavitus thulius Kissinger, NEW SPECIES

Described from 1 specimen. HOLOTYPE: Female, labelled, "Bernard Harbour, N. W. T. (68.48° N, 114.42° W); July 6, 7, 1913; Canadian Arctic Expedition, F. J.;" [Canadian National Collection].

(Fig. 1, 5-8) Length: 2.75 mm; width; 1.32 mm. **Vestiture:** Head, prothorax, and elytra clothed with dense light gray scales, light tan scales arranged to form moderately broad sublateral stripe on dorsal surface of prothorax and sparse, small irregular spots on elytra. Prothorax and elytra with sparse, coarse, suberect, blunt setae about 0.06 mm long; setae mostly in uniserial arrangement on elytral intervals. **Rostrum:** Dorsal surface flat, with shallow lateral impression broad near base and narrowing apically, more or less concealed by vestiture; laterally with scrobe with well defined dorsal margin extending to near eye. **Premmentum:** Trapezoidal in shape, lacking setae on ventral surface, with one seta 0.04 mm long on sublateral dorsal surface; segment 1 of palpus quadrate, bearing on lateral surface 1 large and 1 small seta (large seta broken off near base on specimen); segment 2 ovoid, with one seta 0.4 mm long on lateral aspect; segment 3 cylindrical, with 1 lateral punctate sensillum and 5 nodiform sensillae on apex. **Prothorax:** In profile dorsal surface more convex basally, flattened apically. **Tibia 3:** Apical comb composed of a single row of setae which gradually increase in length from anterior to posterior region of comb, longest seta about 50% longer than shortest; with minute prominence, perhaps analogous to mucro, on apical anterior margin with peculiar seta which is broad at base and abruptly narrowed near apex; this structure not longer than adjacent setae of apical comb and not visible under dissecting microscope. **Female sternum 8:** Apical margin of apical expansion with short, uniformly placed setae. **Female genital tube:** Apical region of coxite bears various setae (not all illustrated on figure); in dorsal lateral aspect with 2 or 3 large setae; stylus with at least 2 setae located near base. **Spermatheca:** Ramus short; nodulus subcylindrical and projecting some distance above structure; cornu gradually narrowed apically; spermathecal duct membranous; spermathecal gland broadly circular in outline, duct between gland and nodulus short. Name based on Latin, *Thule*, for farthest north.

ASSOCIATED MATERIAL

Fossil material from 4 sites represents either *Vitavitus thulius* or a very similar species. The fossils are mostly disarticulated heads, pronota, and elytra which have lost their vestiture. Because the remains are denuded, comparison with the unique recent specimen is excessively difficult. In my opinion the variation seen in the fossil specimens might be expected to occur within 1 species.

Site 1. Lava Camp Mine, Inmachuk River Valley, northern part of Seward Peninsula, Alaska, near the Bering Strait; see Hopkins *et al* (1971) for details about the Pliocene flora and insect fauna of this collection. Apparently the assemblage represents a coniferous, flood-plain forest community similar to

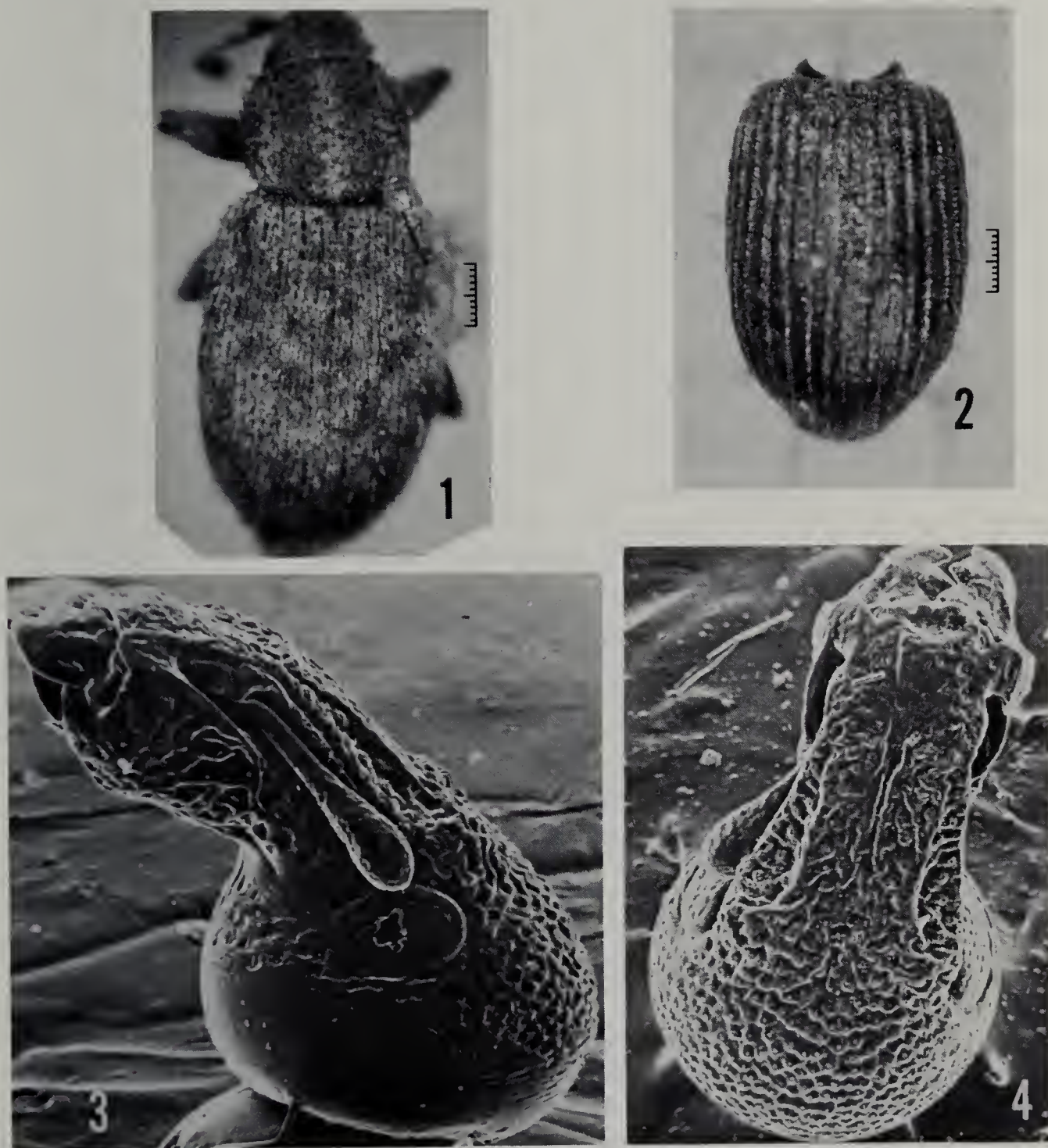


Fig. 1. *Vitavitus thulius* Kissinger, dorsal view of holotype, reference line 0.34 mm.

Fig. 2-4. *Vitavitus* cf. *thulius* Kissinger, Cape Deceit Formation: 2) dorsal view of elytra, reference line 0.32 mm; 3) scanning electron micrograph of lateral view of head; 4) same of dorsal view of head.

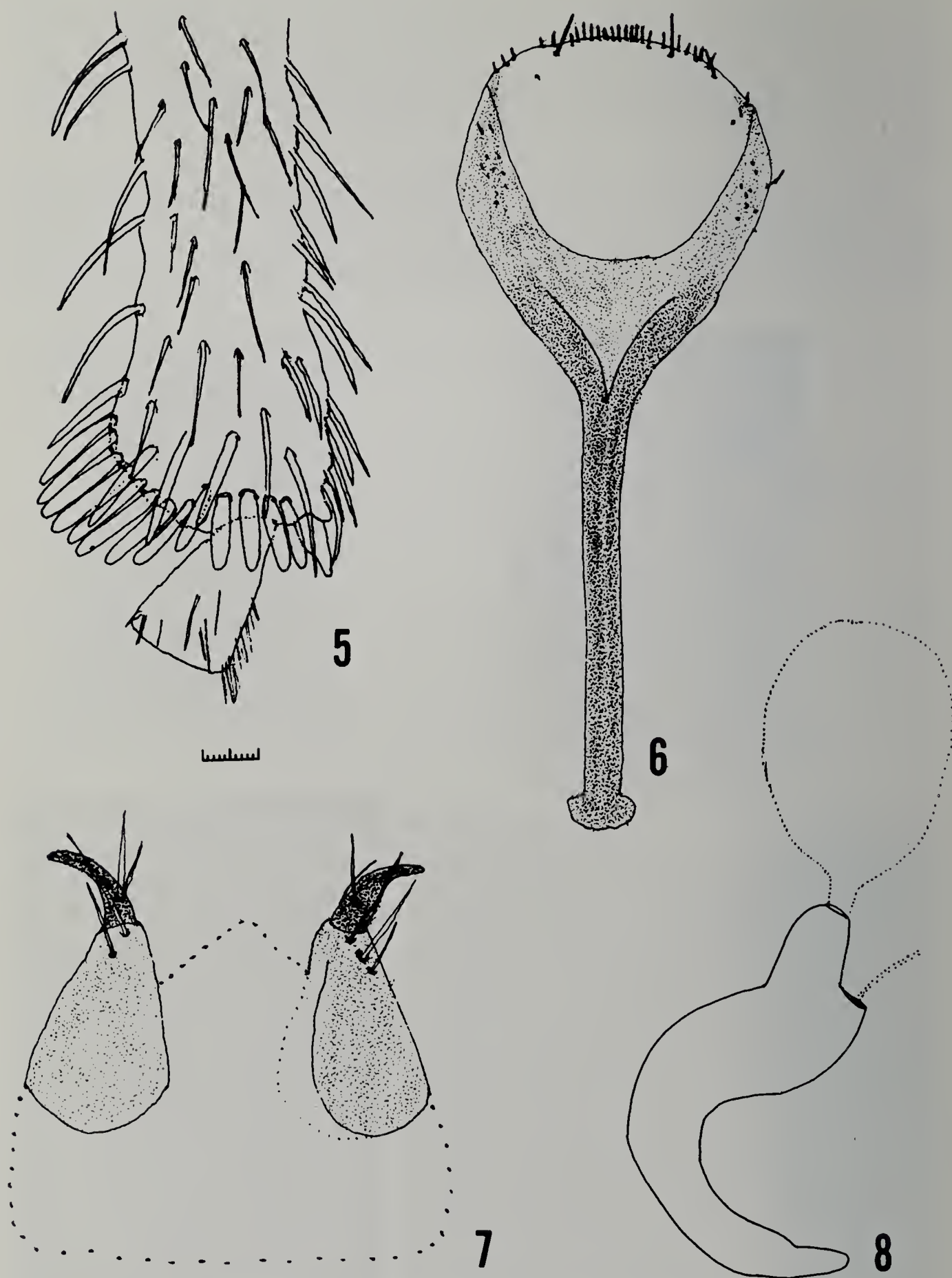


Fig. 5-8. *Vitavitus thulius* Kissinger, holotype. 5) lateral view of apex of left tibia, anterior surface to the right, reference line 0.046 mm. 6) ventral view of sternum 8, reference line 0.09 mm. 7) dorsal view of apical region of female genital tube, reference line 0.09 mm. 8) spermatheca and spermathecal gland, reference line 0.046 mm.

present-day forests in southeastern Alaska and coastal British Columbia. The fossil-bearing sediments are covered by basaltic lava dated by the potassium-argon method at 5.7 million years BP (Hopkins *et al*, 1971). Two heads and a prothorax fragment of *Vitavitus* were found. The heads have the dorsal surface of the rostrum at the base more strongly depressed along the median line than the recent specimen; also the lateral prominence of the frons is more strongly developed. In the next collection (Camp Deceit) is a series of heads, some of which have the rostrum depressed at the base as in the Lava Camp specimen. In view of this it is possible that the 2 types of heads represent extremes of variation of *V. thulius*.

Site 2. (Fig. 2-4). Cape Deceit Formation exposed near Deering, north coast of Seward Peninsula, Alaska. Sediments from this site contain fossil insects, plant macrofossils, and pollen spectra which indicate tundra conditions (Guthrie and Matthews 1971; Matthews MS). A large series (about 290) of isolated heads, pronota, and elytra of *Vitavitus* was found in unit 2 of the Cape Deceit Formation which is dated at 400,000 to 700,000 years BP (Matthews MS).

One outstanding specimen is an articulated mesothorax, methathorax, and abdomen. On the basis of this specimen I am fairly confident that all of the fragments of *Vitavitus* from the sample represent *V. thulius*. The following comparisons are made with the recent specimen of *thulius*. Female genitalia are present in the fossil. Sternum 8 is similar (the central membranous portion of the apical expansion is lost) but is comparatively shorter both in length of strut and apical expansion; however the ratio between the length of these 2 parts is similar. The stylus from 1 coxite is present but apparently was detached when the specimen was dissected; the shape and size are similar. The spermatheca is present and is similar; the cornu is somewhat more elongate, but this can be a common variation within a species. The sculpture of the thoracic and abdominal sterna are similar. The elytra are comparatively longer (mean 2.285 mm, S.D. 0.133); the length of the Bernard Harbour specimen (1.90 mm) is within 2.89 standard deviations of the mean. The width of the elytral intervals on the denuded fossil specimens superficially appears greater, but actual measurements show no significant difference here. An estimate of the distance between suberect setiform scales on the intervals of the denuded specimen was made by determining the distance between the major punctures, which presumably bore such scales, in a row down the center of an interval; spacing is more or less similar. A small area of the elytra of the Bernard Harbour specimen was abraded to remove the scales; the denuded surface of the elytral intervals was similar. The profile of the elytra in side view is similar.

One fossil fragment of the base of a left elytron bears a few suberect scales similar to those seen in *thulius*.

A major variation noticed in the head of the fossils is the presence of a more or less well defined depression on the dorsal median surface at the junction of the frons and rostrum. While it is not possible to discount entirely the importance of the difference, such individual variation does occur in other weevil species.

Site 3. Old Crow River, northern Yukon Territory. J. V. Matthews (G. S. C., Ottawa) is in the process of studying this assemblage. Preliminary evidence indicates that it represents a flood-plain environment within a region of open spruce forest. Some fossils of tundra insects are present in the assemblage.

Carbon 14 dates suggest that the age of the assemblage is greater than 40,000 years BP (Matthews 1972). Remains of *Lepidophorus lineaticollis* Kirby are present in this assemblage along with 4 fragments of *Vitavitus*—a head, right and left elytron, and a pronotum. No significant variation was noticed.

Site 4. Watino, north central Alberta (Westgate, *et al.* MS). The fossil assemblage represents a flood-plain containing ephemeral ponds. Age of the unit containing *Vitavitus* fossils is approximately 27,400 years BP (Matthews 1972). *Lepidophorus lineaticollis* Kirby fossils and 6 heads, 2 pronota, and 1 left elytron of *Vitavitus* were found in the assemblage. The *Vitavitus* heads vary from being virtually flat on the dorsal surface at the base of the rostrum (as in the recent specimen of *thulius*) to having a deep median depression which is accentuated by a transverse depression across the rostrum base with an accompanying reduction in the depth of the lateral basal sulcus on the dorsal surface of the rostrum.

CONCLUSIONS

The recent specimen appears to be significantly smaller than the fossil remains; this is especially evident in the length of the elytra as described above. Such a difference in size has developed between 2 isolated populations of *Ophryastes desertus* (Horn); the population occurring in Death Valley is significantly smaller than individuals occurring near the Salton Sea (Kissinger 1970). Thus, size difference alone is not a sufficient criterion of species distinctness; it may indicate that recent selection pressure on *thulius* favored survival of smaller individuals.

Other significant differences between the fossils and the holotype involve the distinctness of the lateral sulci on the base of the rostrum and the development of a median depression near the base of the rostrum. Because a few individual heads, with especially distinct lateral sulci and a deep median depression, occur along with individuals on which these traits are similar to *thulius*, I am inclined to consider them as extremes of 1 species. At any rate the fragmentary fossil remains do not offer any clear cut evidence that more than 1 species is involved; hence all are referred to *V. thulius*.

SYSTEMATIC NOTES

A very close relative of *Vitavitus* is *Lepidophorus* which past workers (Klima 1935) placed in Alophinae. Wilcox and Baker (1935) showed that various genera formerly assigned to Alophinae possess deciduous processes on the mandible and thus should be assigned to Leptopiinae (Kissinger 1964). Unpublished studies indicate that *Alophus* Schoenherr also possesses mandibular processes and should be assigned to Leptopiinae.

Neither *Lepidophorus* nor *Vitavitus* possess mandibular processes. The problem arises as to which subfamily the genera should be assigned. Of the subfamilies of Curculionidae occurring in North America the ones which might be related are as follows, together with some characters that distinguish the subfamily from *Vitavitus*. Cyllindrorhininae have a deep lateral scrobe on the rostrum and the tibial mucro tends to have an acute spur on the ventral surface. Thecesterninae have a peculiar medial emargination on front margin of the prosternum which receives the rostrum and tibia 3 is both mucronate and uncinata. Cleoninae tend to have the rostrum comparatively longer and

more slender and either the tarsal claws are connate or tibia 3 is uncinat. The Hyperinae are similar in having eyes which are transversely oval in outline, the rostrum is comparatively short and stout; and (at least in the species examined) sternum 8 of the female lacks a basal strut. It must be admitted that my placement of *Lepidophorus* and *Vitavitus* in Hyperinae is tentative. Much comparative study must be done, involving the subfamilies mentioned here, as well as others which are similar but do not occur in North America.

Lepidophorus exhibits the following differential characters in contrast to those described for *Vitavitus*. Mandible with 2 large setae in addition to a small one, lateral aspect of mandible with comparatively broader flat margin; scape extends beyond middle of eye; frons lacking tubercle over dorsal margin of eye (a tuft of setiform scales may be present here); frons narrower than base of rostrum; prothorax usually lacks postocular lobes but these may be present (*lineaticollis* Kirby); prothorax usually lacks postocular vibrissae but these may be present (*lineaticollis* Kirby and *alternatus* Buchanan); tibiae 1-3 may be mucronate; female sternum 8 lacks basal strut; female genital tube distinctly longer than wide, coxite not apparent, lacking stylus and setae.

A dissection of *L. lineaticollis* Kirby indicates that the genital tube is a lightly sclerotized tube which possibly is not extended from the body during oviposition. Observation of living specimens is necessary to confirm this point. Another observation of interest is that the dimensions of the tube are about 1.2 by 0.6 mm; the tube is roughly cylindrical. An egg within this specimen measured about 1.3 by 1.0 mm. Even after making allowances for changes in size and shape during the treatment of the specimen with KOH, one can imagine that the egg laying process in this species must be a mighty feat.

Fragments of *Lepidophorus lineaticollis* Kirby can be distinguished from those of *Vitavitus thulius* as follows. Head: rostrum with dorsal margin of scrobe not sharply defined and not extending to near eye; rostrum lacks basal lateral sulcus; frons lacks lateral prominence over eye and is narrower than base of rostrum; these differences are easily detected. Prothorax: postocular lobes are present but are not as prominent, this is a difference that may be hard to detect; in profile the dorsal margin is more evenly convex and is not flattened apically. Elytra: average length is greater (3.09 mm for *lineaticollis* versus 2.28 mm for *thulius*); the intervals are flatter and the striae comparatively more shallow. I have not seen fossil remains of *lineaticollis* and so can not be more specific.

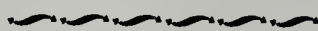
ACKNOWLEDGMENT

I am indebted to Dr. John V. Matthews for calling my attention to the recent specimen described herein, for supplying fossil material from 4 sites for study, for supplying 2 scanning electron micrographs used in this paper, and for his aid and encouragement during the preparation of this paper. Miss Rose Ella Warner loaned for study 4 specimens of *Lepidophorus lineaticollis* Kirby from the United States National Museum.

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COLEOPTERISTS NEWSLETTER

(Continued from p. 192)

Allow plenty of time for more than one exchange of mail when you write for a permit. You may be asked for more information. By requesting permits we emphasize our desire to cooperate with our Mexican colleagues. My personal experience has demonstrated that they are very willing to cooperate and aid visiting foreigners. I was able to collect in the vicinity of Mexico City for 7 days on my recent trip, and I spent 6 of those in the field as the guest of 3 different entomologists who willingly used personal vehicles and their own time to take me collecting. Their generosity was typical of earlier experiences in Mexico, and I confess to a bias in favor of full cooperation on both sides for more mutually profitable field work and scientific endeavors.—Charles W. O'Brien.

DISCOVERED! A NEW COLLECTING PARADISE

Bear Mountain Ranch just north of Silver City, New Mexico is a 200 acre guest ranch owned by the McCormicks. There are forests and meadows adjacent to the Gila National Forest. It is an upper Sonoran region, but a few miles north one finds Canadian zone forest and a few miles south lower Sonoran. It is in part similar to the Cave Creek area of the Chiricahua Mountains in Arizona and in part quite different. I am interested in exchanging beetles and will send a list on request.—Rudolph Lenczy, 126 Los Robles, Green Valley, Arizona 85614.

